

Bell Work: Pre AP
20-Aug-2015

Why is it important to be able to email a document to somebody, give two reasons that are not school focused?

EQ: What is the relationship between measuring units, commerce, and education?

Agenda


Metric System questions

Dimensional analysis recap

Objectives

Use dimensional analysis to convert units
in the metric system

The Metric System

Prefix	Symbol	Value	Factor
kilo-	k	1 000 (thousand)	10^3
hecto-	h	100 (hundred)	10^2
deca-	da	10 (ten)	10^1
	<u>m, L, s, g</u>	One (Base Unit)	10^0
deci-	d	0.1 (tenth)	10^{-1}
centi-	c	0.01 (hundredth)	10^{-2}
milli-	m	0.001 (thousandth)	10^{-3}

Converting in the Metric System: Dimensional Analysis

Moving the decimal place is helpful and fast,
but not as useful as using dimensional
analysis and conversion factors.

Ex. How many mm in 1m?

First – Determine what the conversion factors
are, how are the two units related.

$$1000mm:1m \qquad \frac{1000mm}{1m} \qquad \frac{1m}{1000mm}$$

Converting in the Metric System: Dimensional Analysis

Ex. How many mm in 1m?

Second- Which conversion factor will let you cancel out the unit you have and end with the unit you want, when multiplying?

We want mm and need to cancel out m:

$$1\text{m} \times \underline{\quad ? \quad}$$

$$1000\text{mm} : 1\text{m}$$

$$\frac{1000\text{mm}}{1\text{m}}$$

$$\frac{1\text{m}}{1000\text{mm}}$$

Converting in the Metric System: Dimensional Analysis

Ex. How many mm in 1m?

Third – Set up the conversion and carry it out.

$$\cancel{1m} \times \frac{1000mm}{\cancel{1m}} = 1\ 000mm$$

Converting in the Metric System: Dimensional Analysis

You try: How many ml are in 3dl?

First - What is the relation ship between ml and dl, and the possible conversion factors?

Second – which conversion factor will get give us our desired unit?

Third – Cary out the conversion

$$3\cancel{dl} \times \frac{100ml}{1\cancel{dl}} = 300ml$$

Practice

How many mm are there in 2.1km?

Need to go from km to mm

km → base(meter) → deci → centi → milli

$$2.1\text{km} \times \underline{1\,000\,000\text{mm}} =$$

~~km~~

2 100 000 mm

Converting Metric Units

Making more from a larger number

Multiply by base 10 (number of spaces)

Ex. Convert 2.3 kg to g

$$2.3 \text{ kg} \times \text{_____g} =$$

Ex. Convert 5.7 g to mg.

$$5.7 \text{ g} \times \text{_____mg} =$$

The Metric System

Converting Metric Units

Making less from a number

Divide by base 10 (number of spaces)

Ex. Convert 1.5 g to kg.

$$1.5 \text{ g} \times \text{_____kg} =$$

Ex. Convert 8.2 mg to _____ g.

$$8.2 \text{ mg} \times \text{_____g} =$$

Dimensional Analysis

Start with
the value
and unit
you have

Choose a conversion factor
that allows you to cancel
out the starting (given) unit

$$\text{given} \times \frac{\text{desired}}{\text{given}} =$$

Example: 4.5dm to km

$$4.5\text{dm} \times \frac{1\text{km}}{10000\text{dm}} =$$

Using Dimensional Analysis

If you have a 71in tall person,
how tall are they in cm?

**First: Find an equivalence
between in and cm, then write
the two conversion factors**

$$\frac{1\text{in}}{2.54\text{cm}}$$

or

$$\frac{2.54\text{cm}}{1\text{in}}$$

**Second: Pick the conversion factor that
lets you cancel out the given unit**

**Third: Carry out the
conversion**

$$71\text{in} \times \frac{2.54\text{cm}}{1\text{in}} =$$

LENGTH : Imperial to Metric		
1 inch(in)	2.54cm	25.4mm
6 inches	15.24cm	152.4mm
1 Foot	30.48cm	304.8mm
1 Yard	91.44cm	914.4mm
1 Foot	30.48cm	0.3048m
6 Feet	182.88cm	1.828m
12 Feet	365.76cm	3.657m
30 Feet	914.40cm	9.144m
50 Feet	1524.00cm	15.240m

The Kilo Gram

<http://youtu.be/ZMByl4s-D-Y>

The Metric System

Practice problems – Convert using dimensional analysis.

550 millimeters to meters

3.5 moles to millimoles

1.6 kilograms to gram

2500 milligrams to kilograms

4.0 centimeters to millimeters

5 liters to milliliters

Before you Leave

What are four (4) metric prefixes you need to commit to memory?

Write out the step for using dimensional analysis on a scratch piece of paper.